

Structure: Silicon Monolithic Integrated Circuit

Product: Sound Processor for car audio

Type: BD37541FS

Package: SSOP-A32

Feature

1. Reduce switching noise of input gain control, mute, main volume, fader volume, bass, middle, treble, loudness, by using advanced switch circuit [Possible to control all steps]

- 2. Built-in ground isolation amplifier inputs, ideal for external stereo input.
- 3. Built-in differential input selector that can make various combination of single-ended / differential input.
- 4. Built-in input gain controller reduce switching noise for volume of a portable audio input.
- 5. Decrease the number of external components by built-in 3-band equalizer filter. And, possible to control Q, Gv, fo of 3-band equalizer by I²C BUS control freely.
- 6. It is possible for the bass, middle, treble to the gain adjustment quantity of ±20dB and 1 dB step gain adjustment.
- 7. It is equipped with output terminals of Subwoofer. Moreover, the stereo signal of the front and rear also can be output by the I²C BUS control.
- 8. Built-in mixing input.
- 9. Bi-CMOS process is suitable for the design of low current and low energy. And it provides more quality for small-scale regulator and heat in a set.
- 10. Package is SSOP-A32. Putting input-terminals together and output-terminals together can make PCB layout easier and can makes area of PCB smaller.
- 11. It is possible to control by 3.3V / 5V for I²C BUS.

● Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Power supply Voltage	VCC	10.0	V
Input voltage	VIN	VCC+0.3∼GND-0.3	V
Power Dissipation	Pd	950 ※1	mW
Storage Temperature	Tastg	-55 ~ +150	°C

^{¾1 At Ta=25°C or higher, this value is decreaced to 8.5mW/°C}

When Rohm standard board is mounted.

Rohm standard board: Size : $70 \times 70 \times 1.6 \text{(mm}^3\text{)}$

material: FR4 glass-epoxy substrate (copper foil area: not more than 3%).

Operating Range

<u> </u>					
Parameter	Symbol	Min.	Тур.	Max.	Unit
Power supply Voltage	VCC	7.0	-	9.5	V
Temperature	Topr	-40	_	+85	°C

*Design against radiation-proof isn't made.



Function

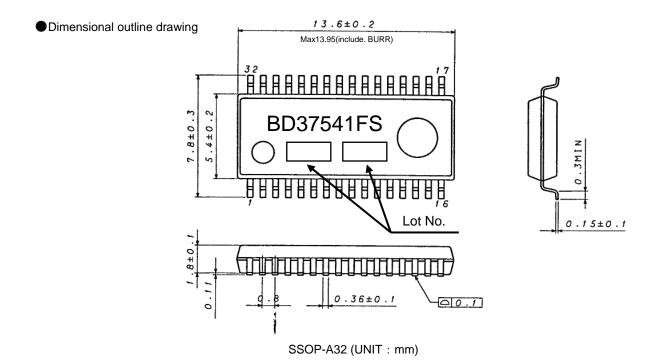
Function	Specifications
Input selector	Stereo 3 single-end input and 2differential input possible to switch single-end input
Input gain	0~20dB (1dB step), Possible to use "Advanced switch" for prevention of switching noise.
Mute	Possible to use "Advanced switch" for prevention of switching noise.
Volume	+15dB~-79dB (1dB step), -∞dB
	Possible to use "Advanced switch" for prevention of switching noise.
Bass	-20~+20dB (1dB step), Q=0.5, 1, 1.5, 2, fo=60, 80, 100, 120Hz
Dass	Possible to use advanced switch at changing gain
Middle	-20~+20dB (1dB step), Q=0.75, 1, 1.25, 1.5, fo=500, 1k, 1.5k, 2.5kHz
	Possible to use advanced switch at changing gain
Treble	-20~+20dB (1dB step), Q=0.75, 1.25, fo=7.5k, 10k, 12.5k, 15kHz
	Possible to use advanced switch at changing gain
Fader	0dB~-79dB (1dB step), -∞dB
	Possible to use "Advanced switch" for prevention of switching noise.
Loudness	0dB∼20dB (1dB step)
	Possible to use "Advanced switch" for prevention of switching noise.
Mixing	Monaural input

● Electrical Characteristic

(Unless specified particularly, Ta=25°C, VCC=8.5V, f=1kHz, Vin=1Vrms, Rg=600 Ω , R_L=10k Ω , A input, Input gain 0dB, Mute OFF, Volume 0dB, Tone control 0dB, Loudness 0dB, Fader 0dB, Mixing OFF)

Item	,		Limit		,	, , , , , , , , , , , , , , , , , , ,
item	Symbol	Min.	Тур.	Max.	Unit	Condition
Current upon no signal	IQ	-	38	48	mA	No signal
Voltage gain	GV	-1.5	0	1.5	dB	Gv=20log(VOUT/VIN)
Channel balance	СВ	-1.5	0	1.5	dB	CB = GV1-GV2
Total harmonic distortion 1 (FRONT,REAR)	THD+N1	1	0.001	0.05	%	VOUT=1Vrms BW=400-30KHz
Total harmonic distortion 2 (SUBWOOFER)	THD+N2	1	0.002	0.05	%	VOUT=1Vrms BW=400-30KHz
Output noise voltage 1 (FRONT,REAR)	VNO1	1	3.8	15	μ Vrms	$Rg = 0 \Omega$ BW = IHF-A
Output noise voltage 2 (SUBWOOFER)	VNO2	1	4.8	15	μ Vrms	$Rg = 0 \Omega$ BW = IHF-A
Residual output noise voltage	VNOR	1	1.8	10	μ Vrms	Fader=-∞dB Rg=0Ω BW=IHF-A
Cross-talk between channels	СТС	1	-100	-90	dB	Rg=0 Ω CTC=20log(VOUT/VIN) BW=IHF-A
Ripple rejection	RR	1	-70	-40	dB	f=100Hz VRR=100mVrms RR=20log(VOUT/VCCIN)
Common mode rejection ratio (D, E)	CMRR	50	65	ı	dB	XP1 and XN input XP2 and XN input CMRR=20log(VIN/VOUT) BW = IHF-A,[※X・・・D,E]
Maximum input voltage	VIM	2.0	2.2	-	Vrms	VIM at THD+N(VOUT)=1% BW=400-30kHz
Maximum gain	GV MAX	13	15	17	dB	Volume = 15dB VIN=100mVrms Gv=20log(VOUT/VIN)
Maximum attenuation	GV MIN	1	-100	-85	dB	Volume=-∞dB Gf=20log(VOUT/VIN) BW=IHF-A
Maximum output voltage	VOM	2.0	2.2	_	Vrms	THD+N=1% BW=400-30kHz





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Block Diagram

VCC/2 GND PC BUS LOGIC Total and an analysis of the state of the stat

Descriptions of terminal

-			
Terminal No.	Terminal Name		
1	A1		
2	A2		
3	B1		
4	B2		
5	C1		
6	C2		
7	DP1		
8	DN		
9	DP2		
10	EP1		
11	EN1		
12	EN2		
13	EP2		
14	MIN		
15	LDA1		
16	LDB1		
17	LDB2		
18	LDA2		
19	MUTE		
20	N.C.		
21	TEST		
22	OUTS2		
23	OUTS1		
24	OUTR2		
25	OUTR1		
26	OUTF2		
27	OUTF1		
28	VCC		
29	SCL		
30	SDA		
31	GND		
32	FIL		

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Cautions on use

(1) Absolute maximum ratings

If applied voltage, operating temperature range, or other absolute maximum ratings are exceeded, the LSI may be damaged. Do not apply voltages or temperatures that exceed the absolute maximum ratings. If you think of a case in which absolute maximum ratings are exceeded, enforce fuses or other physical safety measures and investigate how not to apply the conditions under which absolute maximum ratings are exceeded to the LSI.

- (2) GND potential
 - Make the GND pin voltage such that it is the lowest voltage even when operating below it. Actually confirm that the voltage of each pin does not become a lower voltage than the GND pin, including transient phenomena.
- (3) Thermal design
 - Perform thermal design in which there are adequate margins by taking into account the allowable power dissipation in actual states of use.
- (4) Shorts between pins and misinstallation
 - When mounting the LSI on a board, pay adequate attention to orientation and placement discrepancies of the LSI. If it is misinstalled and the power is turned on, the LSI may be damaged. It also may be damaged if it is shorted by a foreign substance coming between pins of the LSI or between a pin and a power supply or a pin and a GND.
- (5) Operation in strong magnetic fields

 Adequately evaluate use in a strong magnetic field, since there is a possibility of malfunction.

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